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ABSTRACT

Due to legislative mandate, the Ohio Department of Education (ODE) was required to develop a system (the Education Management Information System) that would increase the amount of information available to state-level policy makers and the public. Some recommendations for improving the function of EMIS are offered in this report. The text provides an overview of EMIS's establishment and past efforts to reform the system. Detailed information, such as the EMIS data elements, reliance on a computer network, funding history, and the process of submitting EMIS data, is offered. Concerns that emerged from a study of the system centered around the low priority afforded EMIS by the ODE, the inadequacy of the system, a lack of communication, and the cool interest in EMIS at the district level. Some of the recommendations for improving EMIS include heightening the accuracy of its data, clarifying expectations for EMIS, using more individual student data, and converting EMIS to a relational database. It is argued that for EMIS to function better, the ODE must lead all efforts to improve the system. Six appendices feature a selected bibliography, fluctuation analysis of EMIS data elements, the EMIS data elements, and other information. (RJM)

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Improving Ohio's Education Management Information System (EMIS)

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EA 029 319

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The Legislative Office of Education Oversight (LOEO) serves as staff to the Legislative Committee on Education Oversight. Created by the Ohio General Assembly in 1989, the Office evaluates education-related activities funded wholly or in part by the state of Ohio. This LOEO report identifies major concerns with the Education Management Information System (EMIS) and proposes strategies for improving it. *Conclusions and recommendation in this report are those of the LOEO staff and do not necessarily reflect the views of the Committee or its members.*

This report is available at LOEO's web site: http://www.loeo.state.oh.us.

Summary

Improving Ohio's Education Management Information System (EMIS)

Background

In 1989, the General Assembly required the Ohio Department of Education (ODE) to increase the amount of information available about Ohio schools to state-level policy makers and the public. ODE was given less than two years and limited staff and financial resources to develop a computerized database, the Education Management Information System (EMIS).

The information submitted by districts through the EMIS is more accurate than when paper forms were used.

ODE designed the EMIS as an electronic version of much of the same information (student, staff, and financial) that was previously collected on paper forms. The ability to electronically cross check the figures provided by school districts resulted in more consistent and accurate information than what was submitted prior to the creation of the EMIS.

By designing a system that provides only pre-defined reports, ODE fell short of satisfying the needs of policy makers who also wanted a system that could respond to new and changing policy questions. As a result, state-level users continue to ask questions that cannot be answered by the EMIS and have difficulty interpreting and using the data that are available. The General Assembly further reduced the capability of the system to answer policy questions by not allowing individual student data to be collected at the state level.

ODE's focus on a reporting system combined with the inability to collect individual student data reduced the capability of the EMIS to respond to questions for policy analysis.

By statute, individual student data must be aggregated before it is submitted to ODE by districts. ODE relies upon the existing Ohio Education Computer Network (OECN) and its 24 self-governing data acquisition sites to act as "collection points" for districts submitting their EMIS data to ODE.

Since 1989, over $79 million state dollars have been allocated to the EMIS and an additional $144 million have been provided directly to the OECN as a state subsidy for EMIS and other services.

Current Climate

Within the last year, policy makers passed two significant pieces of legislation focusing on districts' performance and fiscal accountability, S.B. 55 and H.B. 412. As a result, information on district and school performance will be published in a new "report card." If these accountability objectives are to be fully realized, the EMIS data must be as accurate and complete as possible.

The new accountability standards (S.B. 55 & H.B. 412) increase the urgency for a quality system.

While Ohio is viewed by other states and national researchers as a forerunner in collecting elementary and secondary education data, the increasing reliance on the EMIS to inform the new accountability standards increases the urgency for a quality system.

LOEO Conclusions

The current system for submitting and editing data is cumbersome, prone to errors, and burdensome to districts.

Each school district must submit 202 data elements to ODE to satisfy the statutory requirements of the EMIS. Over 5,000 educators in Ohio need to understand how the EMIS functions in order to provide accurate and complete data to the state. The current system for submitting and analyzing data is cumbersome, prone to errors, and not well-understood by district and state-level users, even those within ODE. Furthermore, the process of aggregating the student data before submitting it to ODE makes correcting errors all the more difficult.

The low priority given to the EMIS within ODE has resulted in an overall lack of collaboration among divisions, absence of a basic understanding, and poor technical support.

In order for the existing system to function better at the state, data acquisition site, and district levels, the Ohio Department of Education must lead all efforts to improve the EMIS. ODE should begin by making the EMIS a higher priority. The lack of authority given to the Information Management Services division, the lack of collaboration among ODE divisions, and the lack of basic understanding of how the system works indicate the low level of priority ODE gives the EMIS.

There is no group of ODE employees with knowledge of educational programs *and* how these programs are translated into computer coding for the EMIS. The message that the EMIS is not a priority at the state level trickles down to districts.

While it is unrealistic to expect all 202 data elements to be 100% accurate, steps can be taken by ODE to improve the overall accuracy of the data. ODE could begin by reducing the acceptable margin of error for specific data elements and developing procedures for districts to verify the data entered into the EMIS against source documents.

Improved communication between ODE and districts would result in more accurate data.

Many school districts view the EMIS as a low priority and a burdensome state mandate. Districts with this view typically employ part time EMIS coordinators, have an inadequate process for collecting and entering data into the system, and have the most difficulty submitting accurate EMIS data on time. Very few districts have one person who understands and is responsible for all three types of data -- student, staff, and financial.

In addition, very few district administrators see the value of the EMIS to better inform educational practice. In fact, most district administrators do not use the system for local purposes at all.

While it is clear that school districts need help in changing their perceptions and mindset about using the EMIS, ODE could help change district perceptions significantly by better communicating how the EMIS

operates and how the data are used at the state level. ODE could also simplify the EMIS-related documents provided to districts, including the data definition and procedure manual (*EMIS Guidelines*) and improve its technical assistance to data acquisition sites and school districts.

An evaluation of the quality of services provided by data acquisition sites is needed to improve technical assistance to districts.

ODE could lead the effort to improve technical assistance by evaluating the quality of services provided by data acquisition sites. One-third of the data acquisition sites provide quality services to school districts, while the quality of services provided by the rest is questionable. As the licensing agent for data acquisition sites, ODE has the authority to revoke their operating licenses, but has elected not to exercise this authority. In addition, state subsidy could be withheld from poorly performing data acquisition sites.

Recommendations

To fulfill the accountability requirements of S.B. 55 and H.B. 412, LOEO believes that the following recommendations should be implemented by ODE and school districts to improve the overall operation of the *current* system.

Ohio Department of Education

Despite the urgency under which the system was designed, ODE has never given the EMIS the necessary level of priority. The lack of coordination and collaboration among the various divisions has negative effects on the quality of the EMIS data, usability of the system, and the technical support provided to districts.

LOEO recommends that the Ohio Department of Education:

In order to meet the expectations of the accountability standards, improvements must be made to the technical support, communication, accuracy, and accountability of the EMIS.

- ✓ Increase the priority of the EMIS within the Department beginning with a comprehensive evaluation of its internal infrastructure, equipment, and expertise. The results of the evaluation should be used to develop a strategic plan for the Department that places the EMIS at the center of its information needs;
- ✓ Improve technical support and communication to districts and data acquisition sites, including the adoption of a "customer service" mindset;
- ✓ Improve the accuracy of the EMIS data by reducing the acceptable margin of error for specific data elements, develop model data verification procedures, use a fluctuation analysis to check the year-to-year change in value of more data elements, and pursue an external audit of the data contained in the EMIS; and
- ✓ Improve the accountability of the EMIS by formally evaluating the quality of services provided by data acquisition sites.

School districts

To ensure that the EMIS satisfies the reporting and accountability requirements of S.B. 55 and H.B. 412, LOEO recommends that school districts:

- ✓ Elevate the status and authority of the EMIS coordinators within the districts by assigning them responsibility for the coordination of all student, staff, and financial data.

Policy Options

If the General Assembly is interested in pursuing a system that allows for quick and sophisticated analysis of data that is more accurate, LOEO offers two additional policy options for consideration. Depending on its expectations for the EMIS, the General Assembly could implement one or both of the following policy options.

Option 1: Reduce Reporting Periods to Improve Accuracy

Eliminating the October reporting period would improve the accuracy and usability of the EMIS.

Because state funding for schools is based on student attendance during the first full week in October, districts are required to submit all 59 student data elements at that time. The data reported in October represents a frozen point in time, referred to as the "snapshot." To reflect the changes that take place throughout the course of the school year, districts are required to update all 59 student data elements again in June.

The problems associated with correcting the snapshot file account for many of the inaccuracies in the EMIS as well as its burden on schools. By eliminating the October snapshot from the EMIS, districts and ODE could focus on reporting accurate and timely data for the June reporting period. Basing school funding on the previous year's data would help improve the accuracy and usability of the system.

LOEO recommends:

- ✓ The General Assembly base state funding on school districts' previous year's data.

Option 2: Alter EMIS' Structural Design to Improve Performance

The lack of individual student data at the state level and the absence of a relational database reduce the capabilities of the EMIS to answer complex policy questions.

Although legislators' expected a "flexible database" when the system was authorized in 1989, two essential features have always been absent from the system to completely fulfill this expectation: 1) ODE did not create a relational database; and 2) the General Assembly prohibited individual student data from being collected at the state level. The EMIS can be transformed into a relational database and technology enables individual student data to be collected at the state level without students being personally identified.

Collecting individual, non-personally identifiable student data at the state level helps school districts in correcting their EMIS data. At the state level, individual student data make the EMIS a more flexible database for answering complex questions on program impact and the longitudinal effects of policy decisions.

A relational database would improve the efficiency, accuracy, usability, and flexibility of the EMIS. Also, it would allow more in-depth analyses and more sophisticated questions to be answered by the EMIS. A relational database is necessary if ODE collects individual student data.

If the General Assembly wants to improve the performance and capabilities of the EMIS by creating a flexible management information system that allows quick access to detailed data at the state level, LOEO recommends:

- ✓ The General Assembly allow ODE to collect individual student data that is not personally identifiable.
- ✓ ODE convert the EMIS from a flat file structure into a relational database.

IMPROVING OHIO'S EDUCATION MANAGEMENT INFORMATION SYSTEM (EMIS)

Table Of Contents

I - INTRODUCTION 1
- Background 1
- Current climate 1
- Focus of this report 2
- Methods 2
- Report organization 2

II - STRUCTURE AND PROCESS 3
- EMIS data elements 3
- Reliance on the Ohio Education Computer Network (OECN) 3
- Funding the EMIS and the OECN 4
- Process of submitting EMIS data 4

III - CONCERNS WITH THE EMIS 8
- Low priority within ODE 8
- Usability of the system 9
- ODE's communication 10
- Low priority within districts 12
- Use of data for local decision making 12

IV - IMPROVING THE ACCURACY AND USABILITY OF THE EMIS 14
- Accuracy of EMIS data 14
- Expectations for the EMIS 16
- Individual student data at the state level 16
- Converting the EMIS to a relational database 17

V - CONCLUSIONS AND RECOMMENDATIONS 19
- Recommendations 19
- Policy options 22

APPENDICES

A - Selected Bibliography ..... A-1 - A-3
B - Fluctuation Analysis of Six EMIS Data Elements B-1
C - EMIS Data Elements ..... C-1 - C-3
D - Ohio Education Computer Network (OECN) D-1
E - Education Management Information in Other States E-1
F - Characteristics of Relational Databases F-1

COMMENTS

CHAPTER I
INTRODUCTION

Ohio's new accountability standards, outlined in S.B. 55 and H.B. 412 of the 122nd General Assembly, make the Education Management Information System (EMIS) the most important source of information for evaluating public elementary and secondary schools.

Background

The Education Management Information System (EMIS) was created in 1989 by Am. Sub. Senate Bill 140 of the 118th General Assembly. The Ohio Department of Education (ODE) was required to develop a system which increased the amount of information available to state-level policy makers and the public. The initial legislation reflected the following purposes for the EMIS:

- obtain uniform data for various input and output measures (e.g., number of teachers, test scores);
- compare schools and districts across the state;
- tie operating costs to output measures for efficiency ratings;
- provide numerical data by school, grade level, and subject area to be used in the identification of excellent and deficient schools and districts; and
- establish a flexible database for answering complex questions regarding schools and districts.

To respond to this mandate, ODE developed a computerized database consisting of detailed information on *students*, *staff*, and *finances*. Much of the information ODE had been collecting on paper forms was transferred to the EMIS for electronic submission. To comply with the requirements of S.B. 140, a very complex computer system had to be developed in less than two years with limited staff and financial resources. The haste with which the EMIS was designed and implemented affects its operation to this day.

Current climate

Within the last year, policy makers have increased the level of accountability for elementary and secondary education in Ohio. In July and August, 1997, the 122nd General Assembly passed two significant pieces of legislation focusing on districts' performance and fiscal accountability, S.B. 55 and H.B. 412. Measures such as dropout rates, attendance rates, and the percentages of students passing the 4th, 6th, 9th, and 12th grade proficiency tests will be used to judge the academic performance of schools and districts.

As a reporting mechanism, S.B. 55 requires an annual "report card" to be made available to parents and community members. H.B. 412 gives the Auditor of State authority to conduct performance audits of districts who are in a state of fiscal watch or fiscal emergency.

If the objectives of S.B. 55 and H.B. 412 are to be fully realized, the EMIS data must be as accurate and complete as possible. When LOEO examined compliance with the EMIS reporting requirements, we found that ODE's definition of compliance does not consider the accuracy of the data to the degree needed. Districts could be in compliance with the EMIS reporting requirements and submit inaccurate or missing data elements.

Recently, policy makers and district officials have raised a number of concerns regarding the accuracy of the EMIS data. In the most recent budget (Am. Sub. H.B. 215), the General Assembly addressed these concerns by fiscally sanctioning districts that do not submit accurate EMIS data by the specified deadlines. In addition, district superintendents and treasurers risk having their professional licenses

suspended or revoked for "willfully reporting erroneous, inaccurate, or incomplete EMIS data."

It is important to realize, however, that information about Ohio schools has become much more accurate since the creation of the EMIS in 1989. The replacement of hundreds of paper forms with electronic submissions has resulted in more consistency across records within schools and districts. The ability to electronically cross check figures produces more accurate data than when paper forms were completed by different district personnel and never compared. Furthermore, the data within the EMIS has become much more accurate since its first year of operation.

Ohio is viewed by other states and national researchers as a forerunner in collecting elementary and secondary education data. Ohio was recently selected by the National Center for Education Statistics as its only site for studying how school districts use education data for decision making.

However, the increasing reliance on the EMIS to inform the new accountability standards necessitates an even greater urgency to evaluate the quality of the system. The expectations for what the EMIS can and should be able to do continue to grow, but the design of the system remains unchanged. These design issues, as well as the difficulties that surfaced while the system was being implemented, should be addressed *immediately*, since the EMIS is being relied upon for the new accountability initiatives.

Focus of this report

As testimony to legislative interest in the development and quality of the EMIS, this is the fourth time the Legislative Office of Education Oversight (LOEO) has been asked to study the system since 1990. Previous reports have focused on the status of its implementation (1990), an overall assessment of its implementation and operations (1993), and whether school districts were complying with its reporting requirements (1997).

This fourth LOEO report identifies major concerns with the EMIS and proposes significant strategies for improving it.

Methods

The following five steps summarize LOEO's methods for conducting this study.

1. Reviewed over 70 documents related to computer management information systems. (See Appendix A for a selected bibliography.)

2. Conducted site visits to 13 school districts and four data acquisition sites; five additional data acquisitions sites were interviewed by telephone.

3. Interviewed staff from the Ohio Department of Administrative Services, State Auditor's Office, and various divisions within the Ohio Department of Education. We also interviewed state legislators and legislative staff, a database design specialist, a data specialist .from the National Center for Education Statistics, and officials from 12 states with education management information systems.

4. Convened two focus groups comprised of school district employees who work on the EMIS to discuss their proposed solutions to difficulties with the system.

5. Conducted a fluctuation analysis on various data elements to identify possible inaccuracies by tracking unusually large changes from year-to-year. (See Appendix B for further details on the fluctuation analysis.)

Report organization

The next chapter describes the structure of the EMIS and its process for handling data. Chapter III provides LOEO's findings about the overall concerns with the EMIS, and Chapter IV describes ways to improve its accuracy and usability. LOEO's conclusions and recommendations are in the final chapter.

CHAPTER II
STRUCTURE AND PROCESS

The structure of the EMIS and the process for handling data are complex. Understanding the structure and process is necessary to follow our discussion about the concerns with the current system.

EMIS data elements

Through the EMIS, 202 data elements on *students*, *staff*, and *finances* are collected and electronically transmitted to ODE. Exhibit 1 provides the number of each type of data element and some examples of the range of information required. A complete listing of the data elements and their respective reporting dates is in Appendix C.

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Exhibit 1
Data Elements Collected in the EMIS

Type of Data	Number of Data Elements	Examples
Student	59	date admitted; number of days in attendance; gender; in a vocational program; in an athletic program; courses taken; proficiency test results
Staff	49*	certification status; pay rate; courses taught; funding source
Financial	94	current fund balance; inside millage; number of certificated employees; total assessed valuation
TOTAL	202	

* includes 10 data elements pertinent to the district as a whole, such as number of days in session

Reliance on the Ohio Education Computer Network (OECN)

ODE relies on an existing computer network, the Ohio Education Computer Network (OECN), as the vehicle for electronic submission of the data. The OECN was created in 1979 by the 113th General Assembly to provide cost-effective accounting services to school districts, including the electronic transmission of their financial data to ODE.

The OECN consists of three levels of organization: school buildings and districts; 24 regionally located "data acquisition sites" (formerly A-sites), and the Ohio Department of Education. (See Appendix D for a picture of the OECN structure.)

The 24 self-governing data acquisition sites are crucial to this network because they share computational power and specialized software with school districts. Since all city, exempted village, local, joint vocational school districts, and education service centers are required to report their data through the OECN, over 726 districts use the network for EMIS purposes.

By statute, student data must be *aggregated* before it is submitted to ODE. Because current law prohibits the collection of individual student data at the state level, the data

acquisition sites serve as "collection points" for districts submitting their EMIS data to ODE. As a result, the technical assistance and other services provided by data acquisition sites are essential to school districts successfully carrying out their EMIS responsibilities.

Funding the EMIS and the OECN

Since 1989 over $79 million state dollars have been allocated to the EMIS. An additional $144 million have been provided directly to the OECN data acquisition sites as a state subsidy. EMIS is only one of the many services provided to school districts by the OECN. The state invests a significant amount of funding in the OECN for EMIS and other services provided by the data acquisition sites to school districts.

In several budgets since 1989, the General Assembly has substantially increased its funding to the EMIS for various improvements. Although state funding for the OECN had remained relatively constant from fiscal years 1989 to 1994, the General Assembly increased its funding in fiscal year 1995 by 80% to support the network's role in the SchoolNet initiatives. Exhibit 2 lists the state funding for both the EMIS and OECN since 1989.

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Exhibit 2
State Investment in the EMIS and OECN since 1989

House Bill	General Assembly	Biennium	EMIS Funding (Line Item GRF-446)	OECN Funding (Line Item GRF-426)	Total Investment
111	118th	1989-1991	$7,044,696	$20,258,040	$27,302,736
298	119th	1991-1993	$13,500,000	$20,723,124	$34,223,124
152	120th	1993-1995	$18,000,000	$21,323,136	$39,323,136
117	121st	1995-1997	$18,428,411	$38,240,380	$56,668,791
215 & 650	122nd	1997-1999	$22,360,331	$43,926,937	$66,287,268
TOTAL			$79,333,438	$144,471,617	$223,805,055

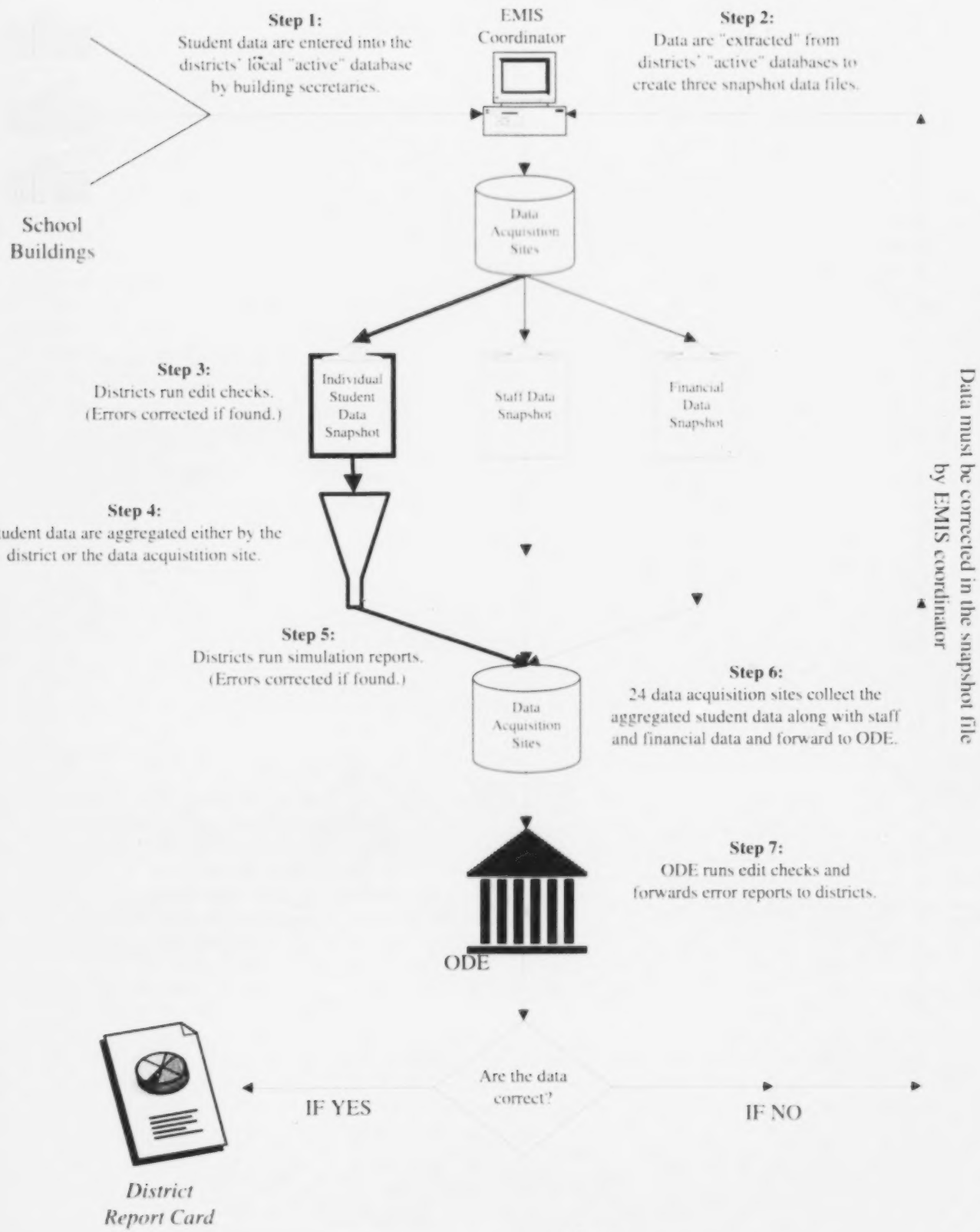
Process for submitting EMIS data

To carry out their EMIS responsibilities, school districts start by entering information about students, staff, and finances into their own local databases. Often these local databases are run on the computers located at the regional data acquisition site. Once entered, the data elements required for EMIS reporting are "extracted" from the local database and stored in a separate file.

LOEO found that the *staff* and *financial* data are typically entered in the district's central administrative office, usually by the treasurer's secretary. However, the *student* data are initially entered at the building level. School building secretaries are responsible for entering the 59 data elements required for each student by the EMIS, plus any additional elements they need locally.

Managing the student data is the most burdensome part of the EMIS for school districts. Many of the concerns about the EMIS stem from the process by which the student data must be handled. Exhibit 3 portrays the various steps in the process of handling the student data.

Exhibit 3
Process for Handling Student Data


Step 1:
Student data are entered into the districts' local "active" database by building secretaries.
School Buildings
EMIS Coordinator
Step 2:
Data are "extracted" from districts' "active" databases to create three snapshot data files.
Data Acquisition Sites
Step 3:
Districts run edit checks. (Errors corrected if found.)
Individual Student Data Snapshot
Staff Data Snapshot
Financial Data Snapshot
Step 4:
Student data are aggregated either by the district or the data acquisition site.
Step 5:
Districts run simulation reports. (Errors corrected if found.)
Data Acquisition Sites
Step 6:
24 data acquisition sites collect the aggregated student data along with staff and financial data and forward to ODE.
Data must be corrected in the snapshot file by EMIS coordinator
Step 7:
ODE runs edit checks and forwards error reports to districts.
ODE
Are the data correct?
IF YES
IF NO
District Report Card

Snapshot file. An important aspect of the process is that data are extracted from the local databases several times a year and reported to ODE. The most important extraction for the student data occurs in October, because under current law school funding is based on the number of students enrolled in the district in the first full week of October. This extracted data represents a frozen point in time and is referred to as a "snapshot."

After building secretaries enter information on each student, the data are sent to the "EMIS coordinator" who extracts the 59 required EMIS data elements to create the student "snapshot" file. This snapshot file remains separate from the district's "active" database. The active database continues to change as the daily operations of the district proceed, such as having students enter and leave the district, while the snapshot file remains frozen.

For at least three weeks after the snapshot is taken, districts run numerous edit checks on the snapshot file to ensure a certain level of accuracy. An edit check will test whether an entry meets some predetermined standard. For example, the "gender" data element will only accept the values "M" or "F" and any other entry in this field is flagged as an error.

Once the district believes the student snapshot is as accurate as possible, the district *aggregates* the student data. At this point, districts run simulation reports on their aggregated data which attempt to mimic the type of error checking procedures done by ODE.

Finding errors. The data acquisition sites forward the aggregated student snapshot files, as well as those for staff and finances, to ODE. Once received, ODE runs a series of more refined edit checks on the data and generates "error reports" for the districts. For example, an ODE error report might compare the number of vocational units for which the district is approved against the number of vocational education students recorded in EMIS. If the number of students is "short" of the number approved, the district must check for possible errors because its unit funding for vocational education is in jeopardy.

The lack of individual student data at the state level becomes a problem for districts when they have to correct the errors identified in the ODE error reports. Because the ODE edit checks are run on *aggregated* student data, ODE cannot tell the district where the error is, only that there is an error somewhere in the file. Therefore, districts must "guess" where the errors may have occurred and start checking student records contained in the snapshot file. As districts reported to LOEO, it takes them longer to find the error than it does to actually correct it. For districts with large student populations, this problem is particularly burdensome.

As noted, the snapshot file reflects what was taking place in the district during the first full week of October. This may differ considerably from what is actually taking place when districts start correcting errors in the file. Because the district's "active" database is updated almost daily to reflect current activities, it is not helpful for finding an error in the snapshot file. For example, new students who enrolled in vocational education after the snapshot was taken cannot be confused with those who were enrolled the first week of October. Instead, school staff have to find the students who were participating in vocational education during the first week of October but whose student records are mistakenly coded as not participating.

The more days that elapse from when the snapshot was taken, the more difficult it becomes to correct the snapshot file, especially given that 59 data elements are required for each student. It is quite easy to mistakenly code one or more of these elements in October. This is especially true for urban districts, whose large and mobile student populations do not begin to stabilize until November.

Districts must be careful to correct mistakes contained in both the snapshot and live files, otherwise the same mistake will occur again when the snapshot is updated.

Adding to the troublesome nature of correcting the October snapshot file is the fact that it will have to be updated at the end of the school year anyway. Recognizing the number of activities occurring during a given school year (e.g., proficiency testing, student transfers between various programs of study, etc.), districts are required to reconcile their October data with an updated snapshot in June. The data reported in June are also used by ODE to adjust state funding and to generate the new S.B. 55 report cards.

By eliminating the October snapshot from the EMIS, districts and ODE could focus their energies on reporting accurate and timely data for the entire school year. Because the data are based on an entire school year and not a single week in October, they are more meaningful to districts and state-level users.

Summary

The current method for basing school funding on data from the first full week of October significantly impacts the accuracy of the EMIS data. Basing school funding on the previous year's data would help improve the accuracy and usability of the system.

CHAPTER III
CONCERNS WITH THE EMIS

As the leader of elementary and secondary education, ODE should lead all efforts to maintain and improve the EMIS.

One of the primary responsibilities of ODE is to provide information about public elementary and secondary education to districts, legislators, and the general public. As the primary source of education data for the state, the EMIS plays an integral part in ODE fulfilling this responsibility. However, after seven years of implementation, districts and state-level users *still* do not understand the purpose of the EMIS or its capabilities. This is due in large part to the design of the system.

ODE designed the EMIS as a reporting system to primarily fulfill its federal and state reporting requirements. By focusing only on the *reporting* rather than *analysis* requirements of S.B. 140, ODE fell short of satisfying the needs of policy makers who wanted a system that could be queried to answer their questions.

The General Assembly further reduced the analysis capabilities by not allowing individual data to be collected at the state level. As a result, state-level users, such as the General Assembly and its staff, continue to ask questions that cannot be answered by the EMIS and have difficulty interpreting and using the data that are available.

Low priority within ODE

Despite the urgency under which the system was designed in 1989, ODE has never given the EMIS the necessary level of priority. As a department, ODE is comprised of over a dozen divisions such as School Finance, Special Education, and Information Management Services (IMS). Each division is responsible for the management and oversight of their respective areas or programs and often their own separate databases. Yet, LOEO found there to be very little coordination or collaboration among the divisions concerning the EMIS.

Coordination among ODE divisions. The lack of coordination and collaboration among the various divisions has negative effects on the quality of the EMIS data, the usability of the system, and the technical support provided to districts. For example, the accuracy and timeliness of the EMIS data submitted by districts is directly affected by the late arrival of key support documents, such as the *EMIS Guidelines* (a data definition and procedure manual) provided by ODE.

Although responsible for operating the EMIS, the IMS division has no authority to require other divisions within ODE to "share" the information that is necessary to make the EMIS operational. Throughout the course of this study, LOEO learned of "turf" battles among the various divisions that ensued from the IMS division trying to exert leadership in coordinating the EMIS and other Department information.

Because the IMS division lacks the authority to amend the *EMIS Guidelines* without the approval of other divisions, the document is delayed and districts do not receive it far enough in advance of the October reporting deadline to make the necessary changes in their data. This directly impacts the quality and accuracy of the data districts submit to ODE.

In addition, LOEO found no "core body" of ODE employees with knowledge of educational programs *and* an understanding of how EMIS operates. For example, area coordinators in the Division of School Finance may be helpful in answering financial questions, but they do not understand the technical aspects for entering and reporting EMIS data. Similarly, the computer programmers in the IMS division lack a depth of understanding for how the

educational programs must be translated into the EMIS codes.

School districts and data acquisition sites call divisions within ODE for technical assistance and receive different answers to the same questions. The director from one data acquisition site provided examples of representatives from ODE sharing information with each other for the first time during an EMIS workshop. This lack of collaboration and coordination among the various divisions creates the perception that the EMIS is a low priority for ODE.

Staff shortages. The understaffed IMS division is another example of the low priority of the EMIS. Reductions in the IMS staff significantly impact the quality and type of services provided to data acquisition sites, districts, and other users of the EMIS data. Since 1990, the number of IMS staff has declined from 46 to 34. While some of these reductions may be due to attrition and departmental budget cuts, there are currently four key positions that remain unfilled, including the Executive Director.

In part, the staff shortages within the IMS division are a result of "market forces." Similar to other government agencies, ODE has had difficulty recruiting and retaining individuals with the necessary knowledge and skills because of higher paying jobs in the private sector. Three of the fifteen programmers have recently left the IMS division for private sector opportunities.

Summary

The low priority given to the EMIS within ODE, the lack of collaboration and coordination among its various divisions, and the lack of understanding of the EMIS by ODE staff impact the quality of EMIS data submitted by districts. These practices convey to districts that the EMIS is not a priority for ODE, therefore, it is not a priority for districts.

Usability of the system

Districts, data acquisition sites, and state-level users consistently reported to LOEO the difficulties they encountered using the EMIS. Most districts have problems using the system because it is not "user-friendly." For example, school district officials described not being able to locally generate reports because of the numerous programming codes needed to do so. As a result, they must rely on the services provided by their data acquisition sites for accessing and navigating their way through the system.

State-level users also expressed frustration over the usability of the system, as well as the condition of the data available on the ODE web site. Frequent users of the EMIS report to LOEO that the data must be significantly "cleaned up" before it can be used in their analyses. In fact, this task requires so much work that one state agency uses the data sets of another ODE division (not IMS) who has already corrected the data.

EMIS software. While ODE developed a common software for districts to use when extracting the *staff* and *financial* data, no such software exists for the *student* data. When EMIS was initially developed, legislators urged ODE to allow districts to use their local vendors and thereby allow as much "local control" as possible. As a result, multiple commercial student software packages were adopted and used to report student data. These packages are not compatible with each other nor with the state-developed staff and financial packages. It is also not possible for ODE to provide technical support for the various packages, which increases districts' reliance on data acquisition sites.

In recognizing the many problems resulting from the lack of a common student software as well as the "year 2000" issue, the General Assembly authorized (through Am. Sub. H.B. 215) ODE "to procure or develop a common EMIS software." However, ODE has chosen to focus only on a common *student* software rather than a common *EMIS* software.

While LOEO believes that this is a step in the right direction, it does not address the need to integrate the student, staff, and financial data. An integrated software package would reduce the manual repetition of data entry by school districts and would reinforce the relationships between student, staff, and financial data.

To date, ODE has neither "procured" nor "developed" a common software package. Due to problems with the selected bidder, ODE cancelled the first Request for Proposal for a software package, and is currently pursuing alternatives.

Technical support. Since ODE does not have enough staff to provide adequate EMIS assistance to school districts, it trains data acquisition site staff who in turn train district personnel. However, not all of the necessary information or understanding about the EMIS is reaching the districts through this approach. As a result, the inadequate training provided by ODE to data acquisition site staff negatively impacts the technical support provided to school districts.

While the EMIS training of data acquisition site staff by ODE has failed, the lack of understanding regarding educational programs remains a problem. Similar to the IMS division of ODE, most data acquisition site personnel are "computer techies" who do not understand the interrelationships between the technical aspects of the EMIS and education programs. As a result, they are unable to transfer such knowledge to school district personnel.

The IMS division of ODE responds to "frequently asked questions" about the EMIS through its mainframe computer system. According to data acquisition site and district officials, this is an effective method to get answers to questions that have already been addressed. However, the IMS division is far less effective in providing support services through other mediums.

One data acquisition site official provided LOEO with documentation of questions posed to ODE over an eight-month period. ODE failed to respond to eleven out of the 27 questions. The official noted, "getting answers to your questions is especially crucial for upcoming reporting deadlines. They're even more critical now that there are severe financial penalties to the districts for not having their data submitted *and* accurate."

Summary

ODE's design of the EMIS for reporting its federal and state data has resulted in a system that is not user-friendly and does not adequately fulfill the needs of districts and state-level users of the data.

ODE's communication

District officials repeatedly conveyed to LOEO that they do not understand how the EMIS data submitted to the state are used in calculations, ODE reports, or in policy making decisions. For the most part, this confusion and lack of understanding is a result of ineffective communication by ODE.

Currently, there are few written materials available that clearly and concisely explain *what EMIS is* and *what it is capable of doing*. The only available document is the *EMIS Guidelines*, a procedural manual that defines how each data element is to be coded by school district personnel. For example, the staff data element "degree type" defines seven possible coding options for certified staff: 0 – non-degree, 1 – associate, 2 – bachelors, 3 – masters, 4 – education specialist, 5 – doctorate, and 6 – other.

The *EMIS Guidelines* is more than 500 pages in length and very difficult to understand. This is particularly troubling given the critical role the *EMIS Guidelines* play in coding and interpreting EMIS data, primarily for districts.

EMIS Guidelines. Districts, data acquisition sites, and state-level users all expressed negative opinions regarding the clarity and usability of the *EMIS Guidelines*. They

wished for a "guidebook" to the EMIS that is non-technical and written for the "average" person. LOEO's review of the literature and interviews with audit agencies emphasize the necessity of establishing and communicating clear definitions of data elements. The lack of clear data definitions and procedures allow districts to interpret similar situations differently for coding purposes.

An example of inaccurate coding based on an unclear data definition: the staff data element "authorized experience years" denotes the total years of *authorized* teaching experience for a district's certified staff. ODE's definition of what counts as *authorized* teaching experience spans two pages and includes 14 criteria that are very difficult to understand. Because of the lack of clarity, it is likely that school secretaries are coding teachers with similar work experience in different manners. School officials told LOEO that they do not trust using the EMIS data to compare districts because of coding differences based on unclear data definitions.

Districts interviewed by LOEO expressed that their greatest difficulties in coding came from the "unique situations" for out-of-district, special education, and vocational education students. Even though such students represent the smallest percentage of their populations, they require the greatest amount of time to code into EMIS.

Even when ODE's data definitions are adequately explained in the *EMIS Guidelines*, some school districts purposely miscode certain data elements which they philosophically believe the state should not be collecting. Such data elements typically contain very personal information about the student's economic status (e.g., disadvantagement code) or the student's reason for withdrawal from school. One school district official told LOEO that it does not report "pregnancy" as the reason for withdrawal in any of its female student records. Instead, this district labels the student's withdrawal reason as "other."

Inconsistencies in coding decisions can invalidate any comparisons that are made when using the EMIS data. State-level users assume that any data they use from EMIS to be 100% accurate, when in reality it is not. For example, any state-level user trying to analyze the differences in staff experience between various types of school districts needs to assume a certain level of error for the data element "authorized experience years."

Because the *EMIS Guidelines* do not adequately meet the information needs of district and state-level users, there is considerable confusion over the meaning of certain data as well as ODE's calculations. One of the most commonly cited examples is the graduation rate.

Graduation rate. The graduation rate is one of the most important yet least understood state calculations among policy makers and school district officials. Districts expressed considerable confusion over the difference in the graduation rate reported by ODE from what they calculated locally. When asked why these differences occur, ODE explained that the lack of individual student data at the state-level requires a series of formulas that "statistically control" for such factors as student dropouts and mobility. ODE explained that these "statistical formulas" are the source of the confusion.

However, LOEO found that the inability to understand the graduation rate calculation is due in part to the formulas used by ODE, in addition to the inadequate explanations of these formulas provided in the *EMIS District Profile Reference Manual* or those provided by the IMS division.

Throughout the course of this study, LOEO made several attempts to acquire a comprehensible explanation of the graduation rate from ODE, but each time we were directed to a reference manual. Currently, the only explanation of the graduation rate appears in the *EMIS District Profile Reference Manual* which is no easier to use or understand than the *EMIS Guidelines*. LOEO still does not have an understandable explanation of how the graduation rate is calculated.

As long as the data definitions, state calculations, and the use of data are poorly communicated, districts will continue to distrust or misrepresent the EMIS data. As one large urban district stated, "we have a 'large city attitude.' We generate our own data and tell the media not to trust the EMIS data."

Over 5,000 staff in schools, data acquisition sites, and ODE need to clearly understand the system in order to submit accurate and timely data. When districts and other users do not understand and cannot replicate calculations for key data elements, they question the accuracy of the data.

Summary

None of ODE's documents suitably explain the definitions for each of the data elements, the relationships between various data elements, or how they are used in state calculations. This reinforces districts' perception that the EMIS data are inaccurate, which adds to their reluctance to use or trust the data.

Low priority within districts

The low priority that ODE gives the EMIS "trickles down" to the district level. Most EMIS coordinators have difficulty completing all of the required duties, mostly because they are part time. EMIS coordinators have other duties in addition to their EMIS responsibilities. It could also be due to their lack of authority over other district staff working on the EMIS, such as secretaries and treasurers.

LOEO was surprised to learn that most districts do not have a truly "coordinated" process for handling all three types of EMIS data. Typically, EMIS coordinators are only responsible for the student data while treasurers manage the financial and staff data. By dividing the responsibilities for the EMIS across several individuals within the district, there is no single person with a complete understanding of the data or how the system works. This often results in distrust of the data's accuracy.

LOEO found that districts who submit the most accurate and timely information have EMIS coordinators who understand the inter-relationships between data elements, the impact of their coding decisions on funding, and the process for submitting data. In addition, these districts typically have full time EMIS coordinators with the authority to ensure that all EMIS obligations are fulfilled by all district staff.

Summary

Districts who submit the most accurate and timely data recognize the importance of the EMIS and give it the appropriate level of priority in their district. Typically, these districts assign EMIS responsibilities to a high-level administrator who oversees all three types of data (student, staff, financial) and has the authority to ensure that all aspects of EMIS are carried out at the building and district level.

Use of data for local decision making

The majority of district administrators interviewed by LOEO do not recognize the value in using EMIS data. In fact, most believe that the only data of merit are those in their local databases that can be used for the *daily* operation of a district. Most district administrators contend that the "historical" and "summary" nature of the EMIS snapshot data make them less useful for local decision making. Most of these administrators characterize the EMIS data as "unrepresentative of what is really taking place in the district." However, the few district administrators who do use EMIS data share a common characteristic -- an understanding of how data better inform their practice.

While many district administrators do not use the EMIS data because they do not trust its accuracy, others reportedly spend their energy strategizing how to react to the public

display of their EMIS data rather than learning how it could be used to improve the educational practices within the district.

Within the last few months, ODE has been working with professional associations such as Buckeye Association of School Administrators and Ohio School Boards Association to train superintendents, treasurers, and school board members on how to use EMIS data. While ODE's efforts are a step in the right direction, more is required. School districts and ODE differ in the types of information they use. To date, ODE has not gained a thorough understanding of school districts' needs or the impediments that currently prevent them from using EMIS data.

Summary

Districts invest a significant amount of financial and human resources into EMIS but most believe that they gain very little from it. If districts believed that they were getting some benefit from the EMIS, they would harbor less resentment, care more about the data (which would improve accuracy), and eventually use the data to inform local decisions.

CHAPTER IV
IMPROVING THE ACCURACY AND USABILITY OF THE EMIS

The accuracy and usability of the EMIS could be improved by adding editing procedures designed specifically to test the accuracy of the data and by altering the structure of the system to better match the current expectations for its use.

Currently, school districts are solely responsible for ensuring the accuracy of EMIS data. In the most recent state budget (H.B. 215), the General Assembly created a new accountability system that gives ODE the authority to fiscally sanction districts or suspend or revoke superintendents' and treasurers' licenses for submitting late or inaccurate data. This should shorten the length of time districts spend correcting EMIS data.

However, the district officials LOEO interviewed believe it is the responsibility of both ODE and data acquisition sites to help districts meet the EMIS requirements; technical assistance from both is essential for school districts to meet these responsibilities.

Even though data acquisition sites receive a significant amount of state funding, there are no standards to judge the quality of the services they provide to school districts. In LOEO's 1996 report, *Ohio SchoolNet Initiatives: The Role of the Ohio Education Computer Network*, we examined the quality of services that data acquisition sites provided to school districts. We found that eight of the 24 data acquisitions sites were "good," eight were "adequate," and eight were "poor." LOEO recommended that all 24 data acquisition sites be formally evaluated and state subsidy be eliminated for those identified as providing poor services.

There has been no formal evaluation of data acquisition sites even though ODE is required by State Board of Education standards to conduct such reviews. Even the Management Council of the Ohio Education Computer Network (MCOECN), the coordinating body of the network, voted in February 1997 to encourage ODE to evaluate the data acquisition sites according to state standards; however, no evaluations have taken place to date.

Accuracy of EMIS data

Other states with education management information systems have ongoing concerns about data accuracy. States such as Florida and Texas, whose systems were operating at least three years prior to Ohio's, are still struggling to increase the accuracy of the data in their systems. These states are increasingly using their education management information systems as the primary data source for assessing the performance of public schools.

LOEO contacted a number of state and national research organizations and states with education management information systems to find standards of accuracy for management information systems. LOEO found no agreed-upon "standards" for judging the accuracy of EMIS data. However, all of the people LOEO contacted agreed that it is unreasonable to expect *all* of the data to be 100% accurate.

LOEO also found that an "acceptable" margin of error should differ for each data element. Information used as a basis for funding should have a smaller margin of error than information unrelated to funding. For example, Average Daily Membership (ADM), which is the basis of funding for Ohio public schools, should be more accurate than the number of students enrolled in extracurricular activities.

ODE and districts told LOEO that the EMIS data elements related to school funding and those that are used frequently for other purposes are the most reliable. ODE's error checking procedures focus mostly on data used for funding purposes. In addition, now that

staffing ratios and proficiency test results are on the report cards, more attention is being paid to the accuracy of this information. In fact, ODE warns EMIS users not to trust data elements that are unrelated to funding or infrequently used.

According to an expert from the National Center for Education Statistics, the best approach to increasing the accuracy of information is "to provide a basis for developing measures to prevent errors." Similarly, a General Accounting Office report found that it costs more to correct data *after* it is entered rather than *before*.

Editing and correcting data. Ohio relies on computer edit checks for ensuring the accuracy of the EMIS data. There are basically two types of edit checks. One type determines if the data entered matches the range of acceptable values, such as "M" or "F" for the gender data element. A second type tests whether entered numbers lie outside a specified range. For example, if the number of days a student is reported to have attended school exceeds the number of possible days school is open in a given year, the number is flagged as an error.

However, neither of these approaches verifies the initial accuracy of the data. In other words, the number of days recorded for the attendance of a particular student may be within the acceptable range of days that school is open, yet the number may not accurately reflect the days that student was actually present.

Neither ODE nor school districts have controls in place that test the accuracy of the data. While some districts interviewed by LOEO compare the data they enter into the system with source documents (e.g., emergency forms, attendance sheets, etc.), most districts do nothing more than review the error reports provided by ODE. Verification procedures that compare source documents with the information entered into the system are what is needed to ultimately measure the accuracy of the data.

Results of the fluctuation analysis. Most of ODE's data verification procedures only compare data elements across reporting periods within the same year from October to June. Comparisons across years only occur for three data elements (ADM, staff count, and unit funding). Examining changes across years is another method of assessing the accuracy of information in the EMIS.

To gain some insight into the level of accuracy of EMIS data, LOEO conducted a fluctuation analysis. This analysis identifies possible inaccuracies in data by tracking unusually large changes in data element values from year to year. Officials from the Texas Department of Education conducted a similar analysis by comparing two years of data and discovered hundreds of instances where a change of over 200% occurred. They subsequently confirmed that over three-fourths of these instances were actual errors in the data. Texas recommended that all of the data in the system be audited.

Of the 202 data elements in EMIS, LOEO examined six elements for the two years ending in 1995 and 1996: Average Daily Membership (ADM); student attendance; staff attendance; student dropouts; student retention; and total handicapped students.

LOEO looked for any changes from year to year that exceeded 50%, 100%, and the generous threshold of 200%. LOEO found some instances of a 200% change for three of the six data elements. These instances raise the *possibility* of an error in the data that warrants further examination; they do not automatically mean the data are incorrect. Appendix B provides more detail on the results of the fluctuation analysis for the 50% and 100% thresholds.

LOEO believes it would be helpful for ODE to use a fluctuation analysis as another way to check for errors in more data elements. A 200% threshold is overly generous, however, for some types of data. As noted, the experts we contacted agreed that an acceptable margin of error should differ for each data element. For data that impact funding levels, the acceptable margin should be much smaller.

For example, during the 1997-1998 school year, an audit by the Auditor of State found eight districts' ADM in error by as much as five percent. According to the Auditor, a five percent error is too high for data that are used as a basis for funding, especially for large districts. A five percent error in ADM for Columbus Public Schools equals approximately 3,150 students. Based on the foundation level funding amount outlined in Am. Sub. H.B. 650 ($3,851), this five percent error translates into about $12.1 million for the 1998-1999 school year.

Using our fluctuation analysis, we found six districts with changes in ADM between 10% and 20% for the years 1995-1996. To determine if these are actually errors, these data should be compared to the original source of the information within the school district. For example, ADM could be compared to enrollment forms. ODE could use this approach to directly assess the accuracy of the data in the EMIS. This effort would require a full-fledged audit.

Expectations for the EMIS

The expectations for the type of questions the EMIS should be able to answer have evolved while the structure of the system has remained the same. The nature of questions currently asked by policy makers reflect their desire to have a system that goes beyond basic reporting to one that allows for more sophisticated analyses.

The increasing reliance on the EMIS data to evaluate schools and answer policy questions has resulted in requests for data and analyses that are not readily available through the EMIS. When these questions cannot be answered, policy makers become frustrated and lose confidence in the system.

However, while legislators expected a "flexible database" in 1989 to answer detailed policy questions, two essential features were missing from the system that prevented this flexibility: 1) ODE did not create a relational database; and 2) the General Assembly prohibited individual student data from being collected at the state level. These features are still absent from the system today and impact the accuracy and usability of the EMIS.

Individual student data at the state level

The public and most policy makers are generally not aware that it is possible to collect individual student data at the state level without revealing the personal identity of students. This is accomplished by replacing a student name, social security number, date of birth, or other personally identifiable information with a unique identification code. Ten of the twelve states LOEO contacted collect individual student data at the state level.

While some of these states use the social security number as the student identification code, most create a unique code unrelated to the social security number. In order for this unique identification code to be portable from one district to another, it is generated at the state level to prevent students from having duplicate identification codes.

Benefits. There are a number of benefits to having individual student data. With unique identification codes, in combination with a common student software package, student files could be transferred between districts. Currently, only districts served by the same data acquisition site share files electronically. This is a particular concern for students receiving special education services. District officials reported having to wait up to three months before students' individual education programs (IEP) are forwarded from other districts.

Collecting individual student records at the state level would reduce the burden placed on school districts in identifying errors in aggregated data. In addition, more detailed analyses would be possible at the state level. Currently, state-level analysts and policy makers are limited to the results of pre-defined analyses made available by ODE, whose staff must try to predict questions that arise.

Legislators are increasingly interested in policy and evaluation questions that require individual student data. With aggregated student data, state-level analysts cannot answer questions such as:

- How many 4th grade students who did not pass the 4th Grade Proficiency Test after three attempts were promoted to the 5th grade?
- Were students identified in 1st, 2nd, or 3rd grade as "reading below grade level" provided with intervention services or summer school programs? If so, how many of these students passed the 4th Grade Proficiency Test?
- Do students who are "retained in grade" actually remain in school? In the long-term, does this policy benefit or harm students?
- What impact do class size and all-day kindergarten have on student performance?
- Do programs for at-risk students such as JOG, GRADS, OWE, or OWA increase graduation rates?
- Do programs such as Head Start and Public School Pre-school improve student achievement?
- What impact does Tech Prep have on student achievement?

District officials expressed "mixed" reactions to collecting individual student data at the state level. Some districts were adamantly opposed to the idea, while others recognized the potential benefits. Based on parents' opposition to providing social security numbers for their children, district officials anticipate that a large number of parents would be opposed to the state's access to individual student data. To help alleviate this opposition, the district officials recommended clearly explaining to parents how individual student data could be collected without revealing the personal identity of students.

Other states. The majority of states that LOEO interviewed cited collecting individual student data and its potential invasion of privacy as a major consideration in designing their state education management information systems. Still, ten of the twelve states that LOEO interviewed report having individual student data at the state level, including Florida and Texas, who are the forerunners in education management information systems. Appendix E provides more detail on other states' education management information systems.

Summary

Collecting individual, non-personally identifiable student data at the state level would help school districts correct EMIS data more easily, which would also improve its accuracy. In addition, the EMIS would be able to quickly answer more detailed policy questions as well as provide data for longitudinal evaluations of state-funded programs.

Converting the EMIS to a relational database

Another limitation of using the EMIS for detailed analyses is its "flat file" structure, where all of the data are stored in separate, stand-alone files or tables. This type of file structure requires the same data to be stored in

multiple locations, creating a greater chance for inconsistencies and errors.

There are no built-in relationships linking EMIS data elements stored in these separate tables; instead, separate computer programs must be written to establish the relationships. Other than the IMS staff at ODE, very few users of the system have the skill to create the necessary relationships among the data elements to perform detailed analyses.

In contrast, a relational database stores data with pre-defined linkages or relationships. Information is stored at the most detailed level (e.g., individual student data) allowing users to easily "query" the system for detailed analyses. For example, student, staff, and financial data would be linked in the EMIS to allow a user to easily calculate the average per-student cost of teaching all industrial technology courses at a given high school.

A relational database would be necessary if Ohio were to collect individual student data at the state level. Appendix F describes some common characteristics of relational databases.

Other states. Ten of the 12 states LOEO contacted use relational database designs for their education management information systems because they believe it offers improved accuracy and maximum flexibility. (See Appendix E.)

Converting the EMIS to a relational database requires proper planning and an adequate amount of time to design, field test, and implement the system. ODE has the hardware to support a relational database but it lacks the skilled personnel to design one. The IMS division is understaffed and consists mostly of programmers with little to no experience designing relational databases.

A relational database would most likely need to be designed and installed by a private contractor. Given ODE's budgetary and staffing restrictions, hiring someone with the necessary skills appears unlikely without additional funding. ODE has taken steps toward improving the usability of the EMIS by purchasing software that mimics a relational database. While this approach partially improves the usability of the system, it does not make the system fully relational.

Summary

A relational database would improve the efficiency, accuracy, and usability of the EMIS and allow for more detailed and in-depth analyses to address policy questions.

CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a series of recommendations and two policy options. The recommendations are the minimum changes needed to make the Education Management Information System operate more effectively and fulfill the accountability requirements of S.B. 55 and H.B. 412. In addition, members of the Ohio General Assembly could select one or both of the policy options based on what they expect the EMIS to be able to do.

In order for the existing system to function better at the state, data acquisition site, and district level, the Ohio Department of Education (ODE) must lead all efforts to improve the EMIS. ODE should begin by making the EMIS a higher priority. The lack of authority given to the Information Management Services division, the lack of cooperation among ODE divisions, and the lack of basic understanding of how the system works by virtually all ODE staff indicate the low level of priority ODE gives the EMIS. Further, there is no group of ODE employees with knowledge of educational programs and how these programs are translated into computer coding for the EMIS. The message that the EMIS is not a priority at the state level trickles down to the district level.

Many school districts view the EMIS as a low priority and a burdensome state mandate. Districts with this view typically employ part time EMIS coordinators, have an inadequate process for collecting and entering data into the system, and have the most difficulty submitting accurate EMIS data on time. Very few districts have one person who understands and is responsible for all three types of data – student, staff, and financial.

In addition, very few district administrators see the value of the EMIS to better inform educational practice. In fact, most district administrators do not use the system for local purposes at all.

While it is clear that school districts need help in changing their perceptions and mindset about using the EMIS, ODE could help change district perceptions significantly by better communicating how the EMIS operates and how the data are used at the state level. ODE could also simplify the *EMIS Guidelines* and improve its technical assistance to data acquisition sites and school districts.

From an earlier study, LOEO found that one-third of the 24 data acquisition sites provide quality services to school districts, while the quality of services provided by the rest is questionable. As the licensing agent for data acquisition sites, ODE has the authority to revoke their operating licenses, but has elected not to exercise this authority.

Recommendations

LOEO believes that at a minimum the following changes should be made to improve how the current EMIS operates.

Increase the priority of the EMIS within ODE.

- In the last two months, ODE hired an Information Technology Officer at the assistant superintendent level. This is a belated step in the right direction. This position should be responsible for overseeing all of the data management functions of ODE. The Information Technology Officer should make the

EMIS the principal data source for all decision making within ODE. Staff at all levels should be required to answer to the Information Technology Officer regarding all information needs.

- The Information Technology Officer should immediately conduct a comprehensive evaluation of ODE's internal infrastructure for collecting and processing information for all purposes, particularly the information used for decision making and for disseminating to external audiences.

- The evaluation should include an assessment of the type of equipment used by each division, their sources of information, and the expertise of division staff in developing databases and other types of mechanisms for storing and processing information.

- The results of the evaluation should be used to develop a comprehensive information management plan for coordinating ODE's internal information and identifying future needs. The EMIS should be at the center of this plan.

- Create a permanent information management group within ODE to coordinate all of the data management functions of the Department. The members of this group should possess the technical knowledge of how the EMIS operates and how educational program areas are translated or coded into the system. This group should be led by the new Information Technology Officer. All ODE employees should have at least a basic understanding of how the EMIS operates.

To improve technical support and communication, ODE should:

- Develop and implement strategies to improve technical assistance to data acquisition sites and school districts.

- Explain the purpose of the EMIS to school districts and users about how data are used by state-level policy makers in an easy-to-read document other than the *EMIS Guidelines*.

- Shift from the primary purpose of fulfilling its own state and federal *reporting* requirements to a system that allows its users to *analyze* information to answer their questions.

- Begin viewing districts and other users of education data as its customers.

- Improve the EMIS software to increase the user-friendliness of the system.

- Improve the ODE web-site by including "raw" data, frequently used data sets, and better explanations of the layout and organization of the data.

- Overhaul the *EMIS Guidelines* to make them more understandable for the typical district employee who may know very little about computers or how the EMIS operates, including:
    - Clarify data definitions for consistent coding across school districts;
    - Provide detailed, clear explanations of ODE calculations;
    - Distribute the *EMIS Guidelines* well in advance of the next school year so school districts have time to make the required adjustments to their systems;
    - Combine all of ODE's reporting requirements into the *EMIS Guidelines* (e.g., special education and vocational education) rather than separate documents;
    - Include page numbers in the *EMIS Guidelines*; and
    - Offer the *EMIS Guidelines* in both unabridged and summarized versions.

To improve the accuracy of EMIS data, ODE should:

- Reduce the acceptable margin of error (tolerance ranges) for specific data elements.
- Develop model data verification procedures that districts could adopt to improve the accuracy of data.
- Use a fluctuation analysis to check the year-to-year change in value of more data elements.
- Pursue an audit of the data contained in the EMIS.

To improve the accountability of the EMIS:

- Data acquisition sites should be formally evaluated by an independent entity against some state minimum standards, in addition to the local expectations of their member districts. Furthermore, ODE should revoke the administrative site licenses of data acquisition sites that provide poor service and should withdraw state subsidy from these sites.

To ensure that the EMIS satisfies the reporting and accountability requirements of S.B. 55 and H.B. 412, LOEO recommends that school districts should:

- Elevate the status and authority of the EMIS coordinators within the districts by assigning them responsibility for the coordination of all student, staff, and financial data.

Policy Options

Depending on its expectations for the EMIS, the General Assembly could implement one or both of the following policy options.

Option 1: Reduce Reporting Periods to Improve Accuracy

Because state funding for schools is based on student attendance during the first full week in October, districts are required to submit all 59 student data elements at that time. The data reported in October represents a frozen point in time, referred to as the "snapshot." To reflect the changes that take place throughout the course of the school year, districts are required to update all 59 student data elements again in June.

The problems associated with correcting the snapshot file account for many of the inaccuracies in the EMIS as well as its burden on schools. By eliminating the October snapshot from the EMIS, districts and ODE could focus on reporting accurate and timely data for the June reporting period. Basing school funding on the previous year's data would help improve the accuracy and usability of the system.

Districts will always increase or reduce in size, therefore, basing state funding on the previous school year could pose problems for districts with substantial changes in their student populations. However, a protocol for handling these exceptional cases could be developed.

LOEO recommends that the General Assembly base state funding on school districts' previous year's data.

Option 2: Alter EMIS' Structural Design to Improve its Performance

The EMIS was created in 1989 to provide information on student performance and district costs to state-level policy makers and the public. Although the expectations for what the EMIS should be able to do continue to increase, the structure of the system has not changed. The EMIS was designed primarily as a reporting system, but increasingly, state-level policy makers expect to use the system to provide detailed and sophisticated analyses which require combining the student, staff, and financial data.

Although legislators expected a "flexible database" when the system was authorized in 1989, two essential features have always been absent from the system to completely fulfill this expectation: 1) ODE did not create a relational database; and 2) the General Assembly prohibited individual student data from being collected at the state level. The EMIS can be transformed into a relational database and technology enables individual student data to be collected at the state level without students being personally identified.

Collecting individual, non-personally identifiable student data at the state level helps the school districts in their correction of EMIS data. At the state level, individual student data make the EMIS a more flexible database for answering complex questions on program impact and the longitudinal effects of policy decisions.

A relational database would improve the efficiency, accuracy, usability, and flexibility of the EMIS. Also, it would allow more in-depth analyses and more sophisticated questions to be answered by the EMIS. A relational database is necessary if ODE collects individual student data.

If the General Assembly wants to improve the performance and capabilities of the EMIS by creating a flexible management information system that allows quick access to detailed data at the state level, LOEO recommends that:

- *The General Assembly allow ODE to collect individual student data that is not personally identifiable.*
- *ODE convert the EMIS from a flat file structure into a relational database.*

APPENDICES

APPENDIX A

SELECTED BIBLIOGRAPHY

Arizona Department of Education. School finance. [On-line]. Available: [http://ade.state.az.us/schoolfinance/details.html].

Blanchette, C.M. (1997). Multiple, nonintegrated systems hamper management of student financial aid programs (GAO/T-HEHS/AIMD-97-132). Washington, DC: Department of Education.

California Department of Education. (1997, June). California school information services. Available: [http://www.cde.ca.gov/csis.htm].

California Department of Education. (1997, July). Educational demographics unit. Available: [http://www.cde.ca.gov/csis.htm].

Caruso, Vince. (1997, July). The evolution of transaction based databases. Available: [http://www.ee.uts.edu.au/eeo/courses/pg/ise/homepages/hmpgs95a/vcaruso/dbhist.htm].

Cheung, O., Clements, B., and Peachman, E. (1997). Protecting the privacy of student records (NCES-97-527). Washington DC: U.S. Department of Education.

Data Warehouse. (1997, June). Architecture for the information age. Available: [http://www.oragmag.com/archives/15cov1.html].

Data Warehouse. (1997, June). Seven steps to building a data warehouse. Available: [http://www.oragmag.com/archives/15cov5.html].

Florida Department of Education. (1997, May). Education information and accountability services (EIAS). Available: [http://www.firn.edu/doe/bin00050/home2.htm].

Florida Department of Education. (1997, June). The basics of school improvement and accountability in Florida. Available: [http://www.firn.edu/doe/bin00048/basics.htm].

Forgione, P. D., and Orland, M. E. (Eds.). (1990). A guide to improving the national education data system. Washington, DC: The National Education Statistics.

General Accounting Office. (1997). Information management and technology (GAO/HR-97-9). Washington, DC: Author.

General Accounting Office. (1996). Davis-Bacon Act: Process changes could raise confidence that wage rates are based on accurate data (GAO/HEHS-95-89). Washington, DC: Author.

General Accounting Office. (1995). Public school enrollment (GAO/AIMO-95-229R). Washington, DC: Author.

General Accounting Office. (1995). Student financial aid: Data not fully utilized to identify inappropriately awarded loans and grants (GAO/HEHS-95-89). Washington, DC: Author.

General Accounting Office. (1990). Improvements planned for automated royalty management system (GAO/IMTEC-90-65). Washington, DC: Author.

General Accounting Office. (1990). Social security: information about the accuracy of earnings records (GAO/HRD-91-89FS). Washington, DC: Author.

General Accounting Office. (1990). Trademark automation: Information on system problems and planned improvements (GAO/IMTEC-91-1). Washington, DC: Author.

General Accounting Office. (1989). Immigration reform: Alien verification system database problems and corrective actions (GAO/IMTEC-89-52). Washington, DC: Author.

General Accounting Office. (1988). ADP systems: EEOC's charge data system contains errors with better controls and information, but system satisfies users (GAO/IMREC-90-5). Washington, DC: Author.

General Accounting Office. (1988). System integrity: IRS can reduce processing errors with better controls and information (GAO/IMTEC-88-25). Washington, DC: Author.

Joiner, C. C. (1996). Davis-Bacon Act: Process changes could address vulnerability to use of inaccurate data in setting prevailing wage rates (GAO/T-HEHS-96-166). Washington, DC: General Accounting Office.

Kentucky Office of Education Technology. (1995). Security of student records in the Kentucky Education Technology System (95-KETS-152). Kentucky: Author.

Leggott, Mark. (1995). Databases: Flat vs. rational. [On-line]. Available: [http://libwww.stfx.ca/cs130/lectures/databases/datatype/html].

Legislative Office of Education Oversight. (1997, April). School district compliance with EMIS reporting requirements. Columbus, OH: Author.

Legislative Office of Education Oversight. (1996, August). Ohio SchoolNet initiatives: The role of the Ohio Education Computer Network. Columbus, OH: Author.

Legislative Office of Education Oversight. (1993, October). An assessment of Ohio's Education Management Information System. Columbus, OH: Author.

Legislative Office of Education Oversight. (1990, October). Education Management Information System: Status of implementation. Columbus, OH: Author.

McColskey, W.H., Altschuld, J. W., and Lawton, R.W. (1985). Predictors of principles' reliance on formal and informal sources of information. Educational Evaluation and Policy Analysis , 7 (4), 427-436.

Microsoft Technical Support. (1997, August). FW1040: database design (relational vs. flat-file). Available: [http://www.microsoft.com/kb/articles/9119/3/82.htm].

Ohio Department of Education. (1997) EMIS district profile reference manual for fiscal year 1997. Ohio: Author.

Ohio Department of Education. (1996). Ohio Education Management Information System: Definitions, procedures, and guidelines. Ohio: Author

Parrish, T. B. (1998). Data use for decision making in Ohio school districts. Ohio Department of Education: American Institutes for Research.

Staff of the Senate Education Committee. (1990). Florida's automated student database: Potential for cohort analysis of graduation and dropout rates. Florida: Author.

State of Florida Office of the State Auditor General. (1992). Making the most of our education dollars (Report No. 3-010). Florida: Author.

State of Florida Office of the State Auditor General. (1992). Performance audit of the automated student database for prekindergarten through 12th grade: Administered by the Department of Education. Florida: Author.

State of Florida Office of the Auditor General. (1986). Performance audit of Department of Education practices and procedures in the administration of selected areas of public school education. Florida: Author.

Stevens, L. N. (1997). Statistical agencies: Consolidation and quality issues (GAO/T-GGD-97-78). Washington, DC: General Accounting Office.

Texas Education Agency. (1998). Data standards for school district data delivery. Austin, TX: Author.

Texas Education Agency. (1997, June). Public Education Information Management System. Available: [http://www.tea.state.tx.us/peims/].

Thrasher, Rick. (1997, July). Database: Relation-ships and flatlfiles. Available: [http://www.c-mug.org/p/rt.filemakerrf.html].

University of Georgia. (1997, July). Limitations of flat file databases. Available: [http://www.cs.uga.edu/~dme/cs101/lecture10/page3.html].

U.S. Department of Education. (1994). Education data confidentiality: Two studies: Issues in education data confidentiality and access, and compilation of statutes, laws, and regulations related to the confidentiality of education date. Washington, DC: National Center for Education Statistics.

U.S. Department of Education. (1995). Improving the capacity of the National Education Data System to address equity issues. Washington, DC: National Center for Education Statistics.

Wyoming Department of Education. (1997, June). Information management. Available: [http://www.k12.wy.us/statistics/index.html].

APPENDIX B

FLUCTUATION ANALYSIS OF SIX EMIS DATA ELEMENTS

LOEO conducted a fluctuation analysis to gain some insight into the level of accuracy of the EMIS data. This analysis identifies possible inaccuracies in data by tracking unusually large changes in data element values from year to year. Of the 202 data elements in the EMIS, LOEO examined six elements for the two years ending in 1995 and 1996. LOEO looked for any changes that exceeded three threshold ranges: 50%; 100%; and 200%. The exhibit below displays the results of the analysis.

Number of Districts with Large Changes Between 1995 and 1996 for Six EMIS Data Elements

Data Elements	Magnitude of Changes		
	50% (50 – 99%)	100% (100 – 199%)	200% (200% or more)
Average Daily Membership (ADM)*	1	--	--
Student Attendance**	--	--	--
Dropouts	87	34	15
Retention grades 1-8	84	70	47
Total Number of Handicapped Students	2	--	1
Staff Attendance	1	8	--

* Six districts had changes in ADM between 10% and 20%.

** Three districts had changes in attendance between 10% and 20%.

These large changes raise the possibility of errors in the data that warrant further examination; they do not, however, automatically mean the data are incorrect. It would be helpful for ODE to use a fluctuation analysis as another method of checking for errors in EMIS data. As noted, for certain data elements, such as those related to funding, a much smaller margin of error should be applied. For example, for data that impact funding levels, the acceptable margin should be much smaller. A 200% threshold is overly generous.

APPENDIX C

EMIS DATA ELEMENTS

The following list includes 202 data elements collected on students, staff, and finances. The Auditor of State determined that all 94 financial data elements are required by law. Ninety-eight student and staff elements are required by state and/or federal law. The remaining 10 staff data elements are not specifically required by state or federal law, but are needed for verification of other data elements or for required calculations.

Student Data

Demographics

1. Building IRN
2. Date of birth
3. Disability condition
4. Disadvantagement
5. District of residence
6. Gender
7. Grade level
8. Grade level, next year
9. Limited English proficiency
10. Racial/ethnic category
11. Student ID
12. Student name (optional)
13. Student percent of time
14. Student status

Attendance

15. Admission date
16. Attendance (days)
17. Attending/home district IRN
18. Attending/home indicator
19. Authorized absence (days)
20. Award of Merit
21. Corporal punishment
22. Curriculum/completer status
23. Date of withdrawal/ dropout/ truancy
24. Diploma date
25. Diploma type
26. Expulsion
27. Graduation credit units
28. Majority of attendance IRN
29. Non-attending reason
30. Re-entry
31. Suspension
32. Unauthorized absence (days)

Programs

33. Academic extra-curricular and intra-curricular programs
34. Athletic extracurricular programs
35. Child day-care
36. DPIA
37. Drivers education
38. Early childhood service delivery options
39. Educational options
40. Enterprise programs
41. Gifted educational programs
42. Immigrant education program
43. Open-enrollment
44. Other regular programs
45. Postsecondary enrollment options
46. School related service programs
47. Special education placement option
48. Special education related services
49. Special education unit
50. Special programs
51. Title I
52. Vocational programs

Subject

53. Course code (for each course taken)
54. Course grade
55. Course status
56. Local classroom code

Competency-based Education

57. Competency-based education results

Proficiency Testing

58. Proficiency testing results

Summer School

59. Student summer school

Staff Data

Demographics

1. *Absence (days)
2. Absence/long term illness
3. *Attendance (days)
4. Authorized experience years
5. *Date of birth
6. Degree type
7. Employee name
8. Gender
9. Racial/ethnic category
10. Semester hours
11. Staff ID
12. Total experience years

Employment

13. Assignment area
14. Certificate application
15. Contracted pay amount/rate
16. Contracted pay type
17. Extended service
18. *Length of work day
19. Local contract code
20. Position code
21. Position FTE
22. Position fund source
23. Position start date
24. Position status
25. Position type
26. *Scheduled work days
27. *Separation reason
28. Type of appointment

Course Master

29. Course code (subject)
30. Course level
31. Course type
32. *Hours of operation for preschool education/ Voc. Ed.
33. Length of scheduled instruction
34. *Local classroom code
35. Location IRN (building)
36. Program provider IRN
37. Semester code
38. Teacher's social security number (for a particular course)
39. Vocational advisory committee (optional)

District-wide Data

1. Building IRN
2. Building square feet
3. District IRN
4. Instructional plan
5. *Kindergarten days in session
6. *Last day of school
7. Lunchroom percentage
8. Number of days in session
9. Transportation percentage
10. Vocational education correlated classes

Financial Data

1. Account description
2. Amount
3. Amount outstanding end of period
4. Capacity of board
5. Case number
6. CFDA number
7. Comments
8. County name
9. Court name
10. Current cash encumbered
11. Current encumbered
12. Current fund balance
13. Current payables
14. Depository name
15. Description of proceedings
16. Description/purpose of issue
17. District IRN
18. Entity IRN
19. Entity name
20. Expense for proceeding for current fiscal year
21. Federal contribution received
22. Federal expenditure during current fiscal year

* These data elements are not required by law, but needed for verification or for required calculations.

23. Fiscal year
24. Fiscal year actual expenditure
25. Fiscal year actual receipts
26. Fiscal year ending
27. Fiscal year revenue
28. Fiscal year expenditures
29. Fiscal year receipts
30. Fiscal year receivable
31. Fiscal year total appropriation
32. Function
33. Fund
34. Fund class
35. Grant title
36. Inside millage
37. Instructional level
38. Interest
39. Interest date
40. Interest rate
41. Issue date
42. Job
43. July 1 cash balance
44. Line number
45. Maturity date
46. Millage - adjusted commercial/industrial
47. Millage - adjusted residential/agricultural
48. Millage - full assessed rate
49. Millage - line number
50. New issues during period
51. Object
52. Operational unit
53. Outside millage
54. Plaintiff/defendant name
55. Plaintiff/defendant type
56. Principal redemptions during period
57. Principle
58. Prior fiscal year encumbered
59. Receipt
60. Receiving fund
61. Receiving special cost center
62. Reporting period
63. Schedule frequency
64. Schedule number
65. Schedule sequence
66. Source
67. Special cost center
68. Statutory authority
69. Subject
70. Tax receipts - personal-general
71. Tax receipts - personal-public utilities
72. Tax receipts - real-commercial/industrial
73. Tax receipts - real-minerals
74. Tax receipts - real-public utilities
75. Tax receipts - real-residential/agricultural
76. Tax receipts - total tax receipts
77. Tax valuation - personal-general
78. Tax valuation - personal-public utilities
79. Tax valuation - real-commercial/industrial
80. Tax valuation - real-minerals
81. Tax valuation - real-public utilities
82. Tax valuation - real residential/agricultural
83. Tax valuation - tax exempt
84. Tax valuation - total assessed valuation
85. Total
86. Total assessed valuation
87. Total average daily membership
88. Total expense
89. Total federal receipt group
90. Total number of certificated employees
91. Total number of non-certificated employees
92. Transaction indicator
93. USAS fund
94. Year

A tally of the data elements collected by EMIS:

Student Data	59
Staff Data	39
District Data	10
Financial Data	94
Total Elements	*202*

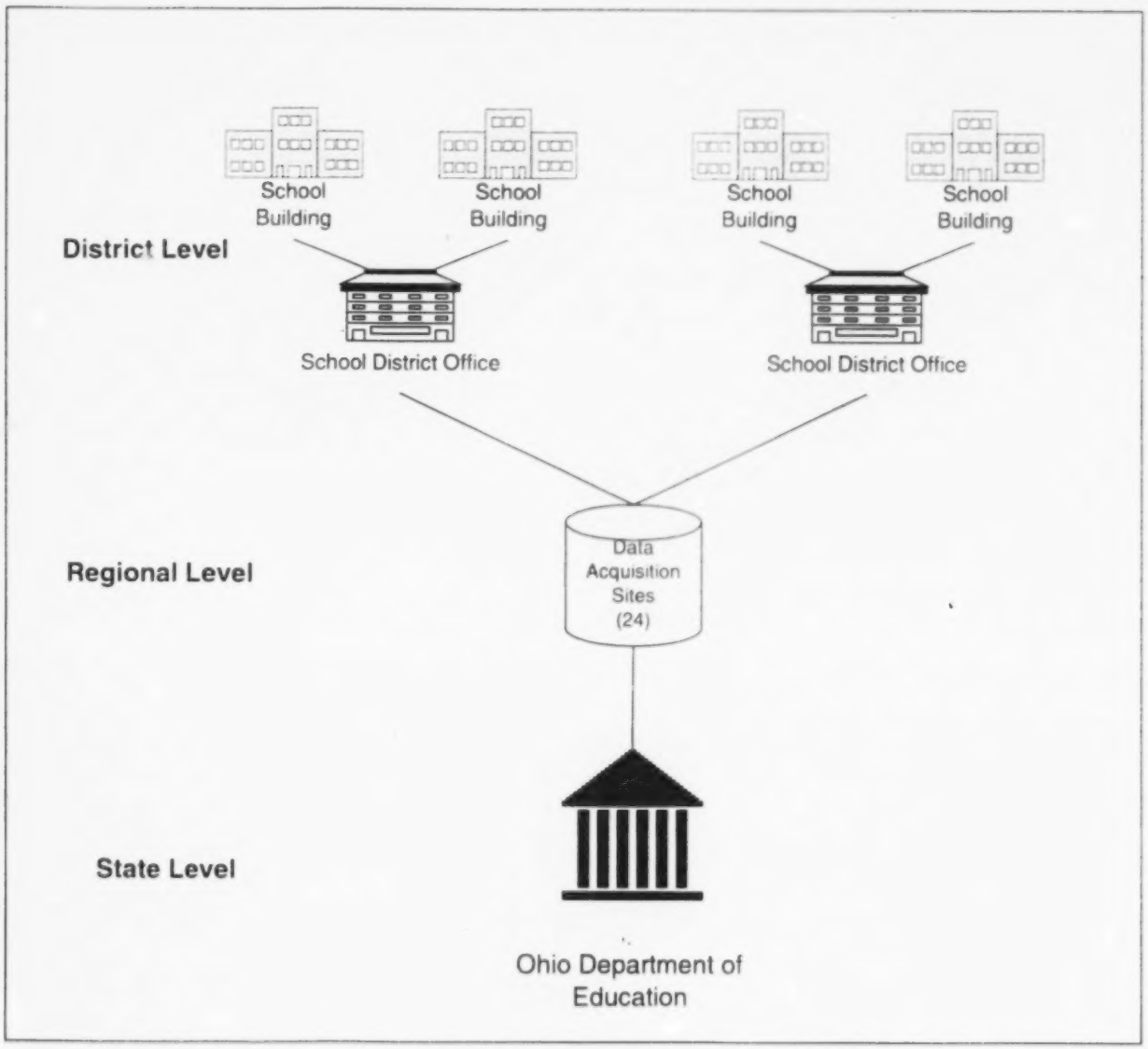
EMIS Reporting Dates

Reporting Period	**Groups of Data**		
	Student	Staff	Financial
October 15	X	X	
October 30			X
December 20	X*		
January 30			X
April 30			X
June 30	X	X	
July 30			X

* Special education enrollments only

APPENDIX D

OHIO EDUCATION COMPUTER NETWORK (OECN)



APPENDIX E

EDUCATION MANAGEMENT INFORMATION IN OTHER STATES

State Interviewed	*Type of Data Collected*			Individual Student Data	Relational File Structure	Completely Implemented System	Type of Checks or Audits (data accuracy)
	Student	Staff	Financial				
California	Yes	Yes	Yes	No	Yes	No	Still developing the mechanisms and procedures; currently considering verifying data at the local level.
Delaware	Yes*	Yes*	Yes*	Yes	Yes	Yes	Audits of its student records.
Florida	Yes	Yes	Yes	Yes	Yes	Yes	Edit and variance checks similar to Ohio.
Iowa	Yes	No	No	Yes	Yes	No	Compares electronic data with paper reports from school districts; considering variance checks in the near future.
Maryland	Yes	Yes	Yes	Yes	Yes**	Yes	Edit and verification checks, along with audits of enrollment data.
Massachusetts	Yes	Yes	Yes	Yes	Yes	No	Unknown.
Minnesota	Yes	Yes	Yes	Yes	No	Yes	Edit and verification checks; compare reported data against other departmental data (e.g., teacher certification).
Nevada	Yes	No	No	Yes	Yes	No	Unknown.
South Dakota	Yes	Yes	Yes	Yes	No	No	Procedures being developed.
Texas	Yes	Yes	Yes	Yes	Yes	Yes	Edit and verification procedures.
West Virginia	Yes	Yes	Yes	Yes	Yes	Yes	School districts verify the data sent to the state; becomes permanent record.
Wyoming	Yes	Yes	Yes	No	Yes	Yes	Verification checks and financial audits.

* Delaware's student, staff, and financial data are contained in separate systems.

** Maryland's file structure is currently flat. The state is contracting the development of a relational system.

APPENDIX F

CHARACTERISTICS OF RELATIONAL DATABASES

As noted in the text of the report, 10 of the 12 states LOEO contacted use relational database designs for their education management information systems because they believe it offers improved accuracy and maximum flexibility over a flat file data base system. Some common characteristics of relational databases include:

- **More efficient and accurate data collection**. Because data resides in only one location rather than several records and tables, there are fewer chances for errors when entering or changing data.

- **Greater flexibility and more sophisticated analysis**. The increased flexibility allows for better, more sophisticated and detailed analyses of data, which in turn results in broader policy and evaluation questions being answered.

- **Improved usability of the system**. The usability of the system improves because the relationships between data elements are displayed to users. Most of today's relational database software allows users to apply a common graphical querying tool, preventing the need for computer programming.

- **Integration of all education data**. A relational database would move the EMIS one step closer to becoming a "data warehouse" for educational information. The information from a data warehouse is more detailed and accurate, and provides the tools that enable the user to view, analyze, and report on data in ways that support decision making. Integrating ODE's various databases (EMIS, teacher certification, special education, vocational education, assessment, etc.) into a data warehouse would offer more comprehensive and detailed educational information for policymakers and the general public.

COMMENTS

State of Ohio
Department of Education
Ohio Departments Building, Room 810, 65 South Front Street, Columbus 43215-4183

John M. Goff
Superintendent of Public Instruction

May 27, 1998

TO: Nancy Zajano, Director

FROM: John Goff, Superintendent of Public Instruction

SUBJECT: Response to LOEO' s Report on EMIS

The Department of Education is pleased to provide this response to the LOEO report *Improving Ohio's Education Management Information System (EMIS)*, dated 13 May 1998.

In general, the department finds itself in agreement with the findings of LOEO regarding the current state of the EMIS system. We appreciate having had the opportunity to provide input during the study and at the study's closing conference. Although not all of our suggested input was used, we find the report accurate and timely.

We also wish to acknowledge the validity of LOEO's recommendations for actions to improve the EMIS system. For the most part, the department agrees with LOEO's recommendations. In fact, as this response indicates, the department has already begun to implement many of the recommendations. Given that several recommendations require either a longer-term effort or a legislative change, our response indicates where we are actively engaged or where further planning or future actions are required.

LOEO Recommendation: Increase the priority of EMIS within ODE.

1. Conduct a comprehensive evaluation of ODE's internal infrastructure.

   ODE's Information Technology Officer began a comprehensive review of technology in use by the department on 09 March. Preliminary findings were reported to the department's senior management and to the State Board of Education on 12 May. Not surprisingly, these findings align with and support the majority of the recommendations of the LOEO regarding EMIS.

2. Develop a comprehensive information management plan.

   As a result of the preliminary findings of a review of ODE's technology use, ODE's Information Technology Officer began a comprehensive information systems planning activity within the department to develop an information technology plan covering all departmental activities. The plan, when completed, will focus on short-term (9 to 12 months) and long-term (18 to 24 months) projects/activities and will involve all divisions of ODE. ODE expects this effort to be a continuing business process for the department and not a one-time event.

3. Create a permanent information management group within ODE for EMIS.

   In May, ODE's Information Technology Officer recommended the creation of an EMIS steering group to be staffed by members of the department's division-level management. This recommendation was accepted by ODE senior management. The EMIS steering group will be made up of ODE division directors and will be responsible for business ownership of the EMIS application. Business ownership includes, but is not limited to, extensive data planning and resource coordination among and between divisions. By establishing business ownership and staffing the steering group with ODE division-level management, EMIS will receive the attention and focus required of such a mission-critical application for the department at the highest levels of management.

The steering group will also oversee the development of EMIS as a departmental resource as the system goes through a planned redesign. ODE expects to hold the first meeting of this steering group in June 1998.

LOEO Recommendation: Improve technical support and communication.

1. Shift the EMIS focus from reporting to analysis.
2. Improve the EMIS software to increase user-friendliness.
3. Improve the ODE web site to provide EMIS data.

ODE has undertaken two projects, one short-term (expected to be implemented within 12 months) and one longer-term (expected to be implemented within 18 to 24 months) that address these three recommendations.

In the short-term, ODE is developing a data warehouse to support EMIS reporting and analysis. This project will begin with the release of an RFP for design services in July 1998. The data warehouse will take data from EMIS and combine it with data from other departmental systems (primarily financial systems including those systems that generate data regarding grant activities) creating one comprehensive database especially designed for analysis. The data warehouse will be constructed using advanced relational database technology and will employ modern decision support software tools.

Using this architecture, the data warehouse will provide support for all types of queries; from complex statistical analysis to everyday reporting requirements. The decision support software will not require the use of complicated programming and will provide access to the data for a wide variety of users across the network. In particular, the decision support software's capabilities for analysis will be extended to ODE's web site, where they can be exploited by users seeking access to the department's data across the Internet.

In the longer-term, ODE is pursuing development of new EMIS data entry software. As part of H.B. 650, ODE was directed to develop a new, comprehensive student administration software package for use by Ohio school districts for K-12 administration. The department issued an RFP in early 1998 for this purpose. In April, after reviewing the vendor responses, the department canceled the RFP and decided to revise its approach to development of the administration software.

The department is now pursuing this software development project with two important ideas in mind; make the software easy for districts to use, and design the software so that both district administration and EMIS requirements are met but data is entered only once. When these two design goals are satisfied, districts will no longer need to enter their data for administrative purposes, and then enter an entirely different set of data to meet EMIS requirements. By designing the application correctly, districts will enter operational data and the application will generate data elements required for EMIS without the districts needing to perform additional data entry activities. The department plans to release a new RFP for this software development effort in July 1998.

Coupling these design elements to a relational database architecture, and revising the data acquisition process to include greater levels of detailed data (while protecting the confidentiality of individual student information), the EMIS application will be converted from a system designed primarily for reporting to a comprehensive data source for analysis.

LOEO Recommendation: Improve the accuracy of EMIS data.

1. Develop data verification procedures for use by districts.

As mentioned above in the section titled *Improve technical support and communication*, by designing the Student Administration software application correctly, the collection of EMIS data can be automated and made a part of the districts' entry of administrative data for regular operations. The design of the application will include significantly more data validity checking than is possible with the existing EMIS data entry system. As cited in the recent report *Data Use for Decisionmaking in Ohio School Districts* (by Thomas B. Parrish of the American Institute for Research), redirecting the power of EMIS to enhance information and data reporting in

ways specifically designed to assist local (district) administrators holds the greatest potential for improving the productivity and accuracy of the system overall.

2. Employ fluctuation analysis to check year-to-year changes.

ODE creates EMIS reports that are sent back to school districts that compare the ADM and numbers of funded units with prior year results. Other analysis is performed that compare data elements used in the performance accountability standards over a number of years. These are all types of fluctuation analysis efforts. In the short-term, ODE will increase its examination of data elements that are collected longitudinally (over a number of years). If legislative change occurs to allow for the collection of student-level data, then these multiple year reviews may be performed on a student by student basis rather than on an aggregated basis, thus providing for a more accurate assessment.

3. Pursue an EMIS data audit.

ODE's division of School Finance currently performs ADM audits that require school districts to compare EMIS data to actual school records. ODE proposes to increase the number of data elements reviewed in these audits and to include those elements used for funding and for performance accountability standards. ODE will review the possibility of working with the State Auditor's office to develop procedures that districts can follow during the annual financial audit to ensure data accuracy, especially for data elements that directly affect funding.

LOEO Recommendation: Improve the accountability of EMIS.

1. Begin evaluation of data acquisition (DA) sites.

While it is true that ODE has not begun on-site DA Site evaluations, the department has been developing the criteria for those evaluations. That work is now complete and a comprehensive set of criteria are ready for use. ODE intends to begin on-site evaluations by using an independent third-party, most likely a management consulting firm. An RFP for this purpose is planned for release in July 1998. The department will not use the Management Council of the OECN for this purpose due to the obvious conflict of interest issues involved.

ODE agrees with the LOEO recommendation to withhold DA Site funding from those sites that do not meet minimum performance criteria. The department will also examine the need for 24 DA Sites. Where it makes business sense to do so, the department will work with the MCOCEN to reduce the number of DA Sites and to align funding to strengthen the services of those that remain.

LOEO Recommendation: Alter the structure and design of EMIS to improve performance.

1. Redesign the EMIS data entry software and database structure to allow for collection of student-level information.

This recommendation will require action on the part of the Legislature to permit ODE to collect student-level information. However, this action need not be seen to be as intrusive as it perhaps has been in previous years. By using advanced encryption technology and by employing data coding techniques under the control of school districts, student-level information can be provided to EMIS for analysis purposes while fully protecting an individual student's privacy and anonymity. Under this approach, an individual student's identity will be masked from EMIS and will be available only to the district. ODE will provide briefings for Legislators and other interested parties to explain this approach and the technology behind it in the near future or on request.

Assuming that ODE receives direction to acquire student-level information, its approach will be as described above under the section *Improve technical support and communication*. By designing the Student Administration application correctly, the collection of EMIS data can be facilitated and burdensome data entry requirements for school districts reduced. The design of the application will include the ability to collect

student-level information, which will already be present due to the need for districts to administer student-level functions on a day-to-day basis, by using the application.

2. Convert the EMIS database architecture to a relational database.

ODE recognizes the need to convert the EMIS database architecture to a relational database. The current EMIS database is archaic and obsolete. It does not readily support the reporting and analysis needs of the department or other interested parties.

In May, ODE committed to purchase relational database software for use in several projects. The department purchased software from Oracle Corporation. Oracle software is well supported in government and industry and is architecturally in alignment with the State of Ohio Information Architecture.

In the short-term, this technology will be used to construct the ODE data warehouse. Part of this purchase will also be used to "seed" DA Sites with relational database technology so that they can better serve their member districts and to provide an architectural foundation for development of ODE's school administration software application.

In the longer-term, ODE's revised approach to the school administration application includes a redesign of the EMIS database. As described above, the application will by design support both a school district's administrative needs and the department's EMIS data requirements. The relational database technology purchased by ODE will provide for the needed flexibility to keep critical operational data at a school district (either at a DA Site or, in the case of large city districts, at a district data center) while providing access to it for EMIS purposes. This redesign effort will be a major systems development project for ODE and will require a funding investment. ODE will request funds for this purpose in its upcoming biennial budget request.

cc: Cynthia DeJacimo